

HYDROLOGIC AND HYDRAULIC ANALYSIS REPORT

LOCATION

Project : 0716-041-374
Route : 716
County/City : Halifax County
Waterway : Banister River

PREPARED BY

Name : John H. Matthews PE
Organization : VDOT
Date : 10/08/14

STRUCTURE DESCRIPTION

Abutment A Station: 109+84.5 Finished Grade Elevation 316.91 ft.

Abutment B Station: 111+28.5 Finished Grade Elevation 316.65 ft.

Minimum Low Chord Elevation 313.01 ft.

Skew 90 to centerline 0 to flood flow

Span Length 2 at 72'

Abutment Type Shelf abutment on piles with a fill slope protected by riprap

Number/Type Piers None

HYDROLOGIC/HYDRAULIC DATA

Drainage Area 589 Sq. Mi.

HISTORICAL DATA

High Water Elevation NA ft. (m) Date of Occurrence

Estimated Discharge NA cfs. (m³/s)

Estimated Exceedence Probability NA %

HYDRAULIC PERFORMANCE

The data presented herein is the result of statistical analysis and indicates an approximate estimate of the performance of this facility.

Discharge (cfs)	Estimated Exceedence Probability (%)	Change in existing flood levels (ft.)	Flood stage upstream of bridge (ft.)	Velocity thru Bridge Structure (ft/s)
6910	50%	0.0	311.1	6.0
11700	20%	-0.1	312.6	8.3
15800	10%	-0.1	314.1	7.0
21900	4%	0.0	315.6	6.0
27000	2%	0.0	316.7	5.6
32700	1% Natural	0.0	317.7	5.1
	1% Floodway			
51400	0.2%	0.0	320.7	4.1

DESIGN SUMMARY

	Exceedence Probability (%)	Stage Elevation (ft.)	
1' Freeboard Flood	50	311.1	
Roadway Design Flood	10	314.1	Rural Local Road
Overtopping Flood	25	312.6	
Base Flood	1	317.7	
Ordinary High Water		304.6	

DEBRIS POTENTIAL**ABUTMENT SLOPE PROTECTION RECOMMENDATIONS**

38" Class II Dry Riprap over 6" no. 25 or 26 aggregate over filter cloth will be hydraulically satisfactory.

SCOUR PLOTS

A sketch of the final scoured bed profile and the check scoured bed profile is attached. If scour countermeasures are required, a request must be submitted to the Hydraulics Unit for their design and documentation.

CAUSEWAYS

The use of causeways for temporary construction access was not considered in this analysis. If it is subsequently found necessary to use causeways, they must be submitted to the Hydraulics Unit for analysis and documentation.

STREAM BANK STABILIZATION

The banks should reestablish themselves to the natural conditions.

The Riprap should be placed on all areas that will not support vegetation.

Disturbed areas outside the bridge should be seeded.

COMMENTS

There are no channel modifications at this location. The existing and proposed bridge fill slopes are at the edge of the defined channel banks at this location. Making the bridge any shorter would encroach into the channel and should be avoided. This design represents the smallest structure practicable for use at this site.

This analysis is only applicable to the structures(s) and approaches described. Any changes in these conditions may invalidate this analysis and should be reviewed by this office.

If this project is an interstate or other **NHS** project and is expected to be in excess of \$1,000,000.00, please notify the **FHWA** that (1) no hydraulic impacts are anticipated or (2) the following hydraulic impacts are anticipated:

If you have any questions or need additional information, please contact _John Matthews PE_ at _804-786-4031_ or via electronic mail at _John.Matthews@VDOT.Virginia.gov_. The completed

"**CONFIRMATION OF DESIGN**" should also be sent to _John Matthews_.

HYDROLOGIC DATA SHEET

The information presented hereon is to be transcribed to the Hydrologic Data sheet contained in the plan assembly.

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DESCRIPTION

Sheet No. 3 Station 110+00

Drainage Area 589 sq. mi

Structure Size 144 ft

BASE FLOOD

Discharge 32700 cfs

Stage Elevation 317.7 ft.

DESIGN FLOOD

Discharge 15800 cfs

Estimated Exceedence Probability 10 %

Stage Elevation 314.1 ft.

1 FOOT FREEBOARD FLOOD

Discharge 11700 cfs

Estimated Exceedence Probability 50 %

Stage Elevation 311.1 ft.

OVERTOPPING FLOOD

Stage Elevation 311.2 ft.

Estimated Exceedence Probability <50 %

HISTORICAL DATA

Date Not applicable due to the influences of Kerr Reservoir

Stage Elevation NA ft.

Estimated Exceedence Probability NA %

REMARKS

CONFIRMATION OF DESIGN

The bridge designer will complete this form and forward it to the Hydraulics Unit confirming that the design that was analyzed is being used.

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STRUCTURE DESCRIPTION

Abutment A Station: _____ Finished Grade Elevation _____ ft. (m)

Abutment B Station: _____ Finished Grade Elevation _____ ft. (m)

Minimum Low Chord Elevation _____ ft. (m)

Skew _____ to centerline _____ to flood flow

Span Length

Abutment Type

Number/Type Piers